

REMARKS

Claims 1 - 21 are pending in this application, of which claims 17 - 21 have been withdrawn from consideration. By this Amendment, claim 1 has been amended. Applicants respectfully submit that no new matter has been added. It is believed that this Amendment is fully responsive to the Office Action dated August 12, 2002.

As to the Merits:

Claims 1 - 16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over **Tsang** (U.S. Patent No.: 5,208,824).

This rejection is respectfully traversed.

Tsang discloses a distributed feed-back (DFB) laser comprising a lower periodic quantum well structure, an intermediate layer, and an upper continuous quantum well structure. The Examiner takes the position that it is an obvious aesthetic design choice to switch these.

However, claim 1 has been amended to clarify that the upper quantum well structured is formed by etching. Etching is done through the upper quantum well structure to the intermediate layer. As shown in Figs. 2A to 2C, a stacked structure comprising the lower quantum well structure 3, an intermediate layer 4, and an upper quantum well structure 5 are grown as shown in Fig. 2A,

then, the upper quantum well structure is etched as shown in Fig. 2B. Here, the intermediate layer 4 serves as an etch stopper layer. The provision of a thick intermediate layer makes it easy to etch only the upper quantum well structure, preventing the lower quantum well structure from being etched. Then, a clad layer 6 is deposited thereover to finish a DFB layer structure.

In contrast to the Applicants' invention, Tsang's structure should be manufactured by, first forming a lower quantum well structure, then etching the lower quantum well structure, embedding the etched lower quantum well structure with a spacer layer 15 and a clad layer 16, and then forming the upper continuous quantum well structure. To make the upper quantum well structure flat, it is necessary to preliminarily form a planarized surface. The spacer layer 15 is shown to have a planarized surface. However, the as-grown surface may have periodic protrusions reflecting the shape of the periodic lower quantum well structure. Then, it is necessary to planarize the surface of the spacer layer 15. In short, Tsang's structure should be manufactured by first growing the lower quantum well structure, etching the lower quantum well structure, embedding the lower quantum well structure, planarizing the surface, and then growing the upper quantum well structure.

According to the Applicants' invention, it is necessary to first grow the overall quantum well structure including the lower quantum well structure and the upper quantum well structure, then etching only the upper quantum structure, and then embedding the upper quantum well structure.

As described above, the require processes for the Tsang structure and the Applicant's structure are quite different. That is, it is not only an aesthetic design choice.

In addition, claims 2 - 16 depend from claim 1, and should be distinguished over Tsang for at least the reasons set for above.

In view of the aforementioned amendments and accompanying remarks, claim 1 - 16, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

Attached hereto is a marked-up version of the changes made to the by the current amendment. The attached page is captioned "Version with markings to show changes made."

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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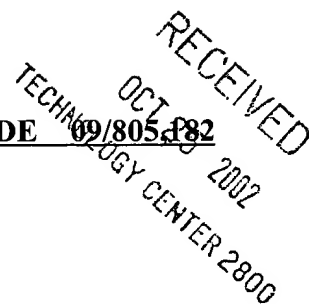
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Enclosures: Version with markings to show changes made



VERSION WITH MARKINGS TO SHOW CHANGES MADE 69/805,182

IN THE CLAIMS:

Claim 1 has been AMENDED to read as follows:

1. (Amended) A distributed feedback semiconductor laser, comprising:
a lower quantum well structure extending along a resonator direction, said lower quantum well structure having a lamination of alternately stacked lower barrier layer and lower well layer having a band gap narrower than the lower barrier layer;
an intermediate layer disposed on said lower quantum well structure, said intermediate layer having a band gap broader than the lower well layer and a thickness thicker than the lower barrier layer; and
an upper quantum well structure periodically disposed on said intermediate layer along the resonator direction, said upper quantum well structure having a lamination of alternately stacked upper well layer and upper barrier layer having a band gap broader than the upper well layer,
wherein envelope of the upper quantum well structure is formed by etched profile which extends to said intermediate layer.